

## Scientific Paper Session: Trunk Sunday January 25, 2015 11:15am-12:30pm

### 11:15 AM - 11:19 AM

A Cost-utility Assessment of Mesh Selection in Clean and Clean-Contaminated Ventral Hernia Repair (VHR)

University of Pennsylvania, Philadelphia, PA, USA

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#### Introduction:

Ventral hernia is a common, challenging, and costly problem in the United States. The use of ADM has provided a tool to perform single-stage ventral hernia repairs (VHR) in challenging wounds, but can be associated with higher complications, cost, and poor longevity. The aim of this study is to perform a cost-utility analysis of ADM and synthetic mesh in VHR.

#### Methods:

A systematic review was performed identifying articles containing comparative outcomes for synthetic mesh and ADM repairs. A web-based visual analog scale survey was administered to 300 nationally-representative community members to determine quality-adjusted life-years (QALYs) for several health states related to hernia repair (GfK Research). A Decision tree was created for the reference cases (VHR with ADM or synthetic) and up to six additional post-operative scenarios. Inputs included cost (DRG, CPT, and retail costs for mesh), quality of life, and health-outcome probability estimates. Overall expected cost and QALYs for VHR were calculated and compared using the roll-back method. The cost effectiveness threshold was set at \$50,000/year-of-life gained.

#### Results:

There was a 16% increase in the risk of a complication occurring after VHR when using biologic mesh compared to synthetic mesh in CC fields. This risk increased to 30% in clean fields. In CC fields, there was an increase of \$8,022.61 in expected cost of VHR when using biologic mesh relative to synthetic mesh with a loss in clinical efficacy of 0.47 QALYs. This

resulted in an ICUR of -\$17,000/QALY. There was an expected increase of \$11,694.02 with a clinical loss of 0.51 QALYs when using biologic mesh in clean fields resulting in an ICUR of -\$23,000/QALY. Sensitivity analysis revealed that the recurrence rate of biologic mesh needs to be below 5% or the recurrence rate of synthetic mesh needs to be greater than 23% for biologic mesh to be cost effective in CC fields. In clean cases, the recurrence rate of synthetic mesh needs to be greater than 21% in order for biologic mesh to be cost effective.

### **Conclusions:**

This cost-effectiveness analysis of mesh selection indicates that biologic meshes are not cost effective relative to synthetic mesh in clean or CC defects. From a societal perspective synthetic mesh is both cheaper and more clinically effective than biologic mesh. Given the high prevalence of hernia and its associated cost to society, our data is critically important in improving cost-effective repair techniques, providing value-based care, and conserving healthcare resources.

### **11:19 AM - 11:23 AM**

Vascularized rib as an alternative in bone defect reconstruction

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Alexandru Georgescu, Prof, MD, PhD; Ileana Matei; Irina Capota; Filip Ardelean; UMF Iuliu Hatieganu

#### **Introduction**

Direct traumatic open fractures or their complications, as osteomyelitis and nonunion, represent the main etiology of bone defects in both upper and lower limb. If soft tissue defects are also present, the management of these lesions becomes more challenging<sup>2</sup>. The most used flaps in these cases are the vascularized fibula osteoseptocutaneous flap, the vascularized iliac osteocutaneous flap, and the vascularized muscular-rib flap. We previously reported about the advantages and the few complications by using the muscle-rib flap, and about the advantages of all-in-one reconstruction in complex injuries of the limbs involving both bone and soft tissue defects by using these flaps.

#### **Materials and Methods**

The study refers to 44 patients operated for acute or sequellar traumatic composite bone and soft tissue defects in both upper and lower limb. The upper limb was involved in 18 cases, and the lower limb in 26 cases; the etiology of the defects was an acute trauma in 15 cases, and a posttraumatic complication in 29 cases. The average length of the bone defect was 8,2 cm (range, 4 to 14 cm), and the surface of soft tissue defect ranged between 6 and 475 cm<sup>2</sup>. The flap used was the SA-R in 24 cases, the LD-R in 10 cases, and the LD-SA-R in the remaining 10 cases; from these, 38 were free flaps, and 6 pedicled flaps.

#### **Results**

The average follow-up in our 44 patients was 23,1 months (range, 12 to 48 months). In 95,4% of cases (42 out of 44), we had complete flap survival. In only one case we registered a superficial wound infection, which was solved conservatively.

Regarding the long term results, we registered a rate of primary bone union of 97,7% (43 out of 44 cases), with an average time of 6,6 months, shorter for bones in hand and foot-2 months, but longer for femur and tibia-7,3 months. We had a single nonunion, due to the recurrence of

osteitis, which was solved after staged debridements and a fibula-pro-tibia pedicled transfer; in this case, the union was obtained only after 15 months.

## Conclusion

The vascularized rib(s) as part of a composite flap represents a good indication especially in bone defects associated with large soft tissue defects.

## 11:23 AM - 11:27 AM

Inter-Rectus Abdominis Muscle Distance is an Independent Predictive Factor for Development of Postoperative Ventral Hernias

The University of Texas MD Anderson Cancer Center, Houston, TX, USA

Roberto A. Martinez, MD; Alexander T. Nguyen, MD, FACS; Donald P. Baumann, MD, FACS; Hong Zhang, PhD; Charles E. Butler, MD, FACS; The University of Texas MD Anderson Cancer Center

**Introduction:** Ventral incisional hernia (VIH) continues to be a common occurrence and source of patient morbidity. While various defect, patient and technical factors have been shown to be associated with increased risk of VIH, little attention has been paid to specific findings on pre-operative imaging. We evaluated specific pre-operative radiographic findings and clinical risk factors for the development of VIH.

**Methods:** We retrospectively reviewed prospectively collected data from consecutive patients with available pre-operative CT scan and  $\geq 1$  year of follow-up who underwent open radical cystectomy for muscle invasive bladder cancer over a 6-year study period at a single academic center. We evaluated several prospective CT findings including inter-Rectus Abdominis Muscle distance (IRD), umbilical hernia, ventral hernia and the width and length of each. Patient, disease and laparotomy closure technique factors were also evaluated. The primary outcome was development of VIH. Secondary outcomes included surgical and wound healing complications. Univariate and multivariate logistic regression were used to identify independent radiographic and clinical predictors of VIH.

**Results:** A total of 498 consecutive patients were included with  $38.6 \pm 19.9$  months follow-up. The overall rate of VIH was 27.9% (n=139). The mean IRD above and below the umbilicus were  $3.09 \pm 1.5$ cm and  $0.8 \pm 0.96$ cm, respectively. One-hundred patients (20%) had an umbilical hernia evident on pre-operative CT scan. Independent radiographic findings predictive of VIH on pre-operative CT-scan were rectus diastasis with an IRD  $> 3$ cm (HR=2.41; CI=1.65-3.53,  $p < 0.001$ ) and umbilical hernia (HR=1.68, CI=1.14-2.51,  $p = 0.009$ ). Additionally, a BMI of  $> 35$  (HR=3.89; CI=2.76-7.36;  $p < 0.001$ ) was found to be an independent predictor of VIH.

**Conclusions:** Patients with a pre-operative rectus diastasis, IRD  $> 3$ cm, are at increased risk for the development of VIH. This new information is important to help stratify risk of postoperative VIH. Patients with a pre-operative IRD  $> 3$ cm, BMI  $> 35$  or umbilical hernia should be counseled on the increased risk of post-operative VIH.

**11:27 AM - 11:33 AM**

**Discussion**

**11:33 AM - 11:37 AM**

Technique and Outcomes of Laparoscopic Bulge Repair after Abdominal Free Flap Reconstruction

Albany Medical Center, Albany, NY, USA

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Introduction:

Bulges and hernias after abdominal free flap surgery are uncommon with rates ranging from as low as 0.9% to 11%. Incisional hernia management is well described in the general patient population with a current trend towards performing laparoscopic repairs to decrease length of hospital stays, pain, and infection rates. In the free flap breast reconstruction population, there are no clear guidelines or optimal strategies to treating post-operative bulges and hernias. We describe our minimally invasive technique and outcomes in managing bulge complications in abdominal free flap breast reconstruction patients.

Materials/Methods:

A retrospective review was performed on all abdominal free flap breast reconstruction patients at Albany Medical Center from October 2011 to June 2014. All patients with bulges or hernias suspected on clinical exam or reported symptoms underwent abdominal computed tomography (CT) imaging prior to consultation with a minimally invasive surgeon. Confirmed symptomatic bulges were repaired laparoscopically using a collagen and polyester composite mesh in an underlay fashion. Patients were monitored regularly in the outpatient setting.

Results:

Sixty two patients received a total of 80 abdominal free flap breast reconstructions. Flap types included 41 deep inferior epigastric perforator (DIEP), 36 muscle-sparing transverse rectus abdominus myocutaneous (MSTRAM), 2 superficial inferior epigastric artery, and 1 transverse rectus abdominus myocutaneous flap. There were a total of 6 (7.5%) bulge complications - 3 (8.3%) MSTRAM and 3 (7.3%) DIEP reconstructions. CT scans demonstrated no true hernias. Average time to detection was 204 (77-406) days. Four (66%) patients with bulges were persistently symptomatic and repaired laparoscopically using an average composite mesh size of 393.3(280-600) cm<sup>2</sup>. Average length of stay was 2.5 (2-3) days.

There were no complications, revisions, or recurrences from laparoscopic bulge repair after an average follow-up of 181(79-243) days.

Conclusion:

Although uncommon, bulge and hernias after abdominal free flap reconstruction can create significant morbidity to patients and a particular challenge to repair in an area of previous major reconstructive surgery. Laparoscopic hernia repair using composite mesh underlay offers an alternative to traditional open hernia repair and can be successfully used to minimize scarring, infection, and pain to free flap patients who have already undergone significant reconstructive procedures.

### **11:37 AM - 11:41 AM**

#### **Surgical Site Complications After Primary Versus Flap Closure of Pelvic Defects Following Abdominoperineal Resection (APR) or Pelvic Exenteration (PE): A Systematic Review and Meta Analysis**

Johns Hopkins University , Baltimore, MD, USA

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(1)MedStar Georgetown University Hospital, (2)Johns Hopkins University

**Introduction:** Abdominoperineal resection (APR) and pelvic exenteration (PE) for resection of numerous malignancies can lead to large pelvic defects. Resulting perineal wound complications pose significant morbidity following these operations, particularly in previously irradiated fields. Myocutaneous flaps have been proposed in place of primary closure of large perineal defects to improve local wound healing. We have conducted a systematic review and meta-analysis to compare primary closure to myocutaneous flap reconstruction of perineal defects following APR or PE in regards to surgical site complications.

**Methods:** A literature search for human cohort studies comparing surgical outcomes of primary closure with myocutaneous flap reconstruction after APR or PE was performed using Medline, EMBASE, Google Scholar and Cochrane databases up to June 2014. Patient demographics, comorbidities, oncologic information, length of stay, and surgical outcome data were extracted from included studies. Meta-analysis was performed to investigate differences between primary and myocutaneous flap closure within the following surgical outcomes: total perineal complications, major and minor perineal complications, and abdominal wall complications.

**Results:** Following a 3-reviewer independent screening process, 10 eligible studies (1 randomized-controlled trial, 9 retrospective studies) involving 479 patients (186 flaps, 293 primary closures) met inclusion criteria. Eight studies described rectus abdominus myocutaneous (RAM) flaps, 2 studies used gracilis flaps, and one study reported on a mixed cohort. Pooled odds ratio forest plots of assessed surgical site occurrences were created for meta-analysis. Total perineal complications were twice as likely to occur with primary closure compared to myocutaneous flap closure (OR= 2.05; p=0.001). Major perineal complications approached statistical significance, being more than twice as likely to occur with primary closure compared to flap closure (OR=2.22; p=0.05). There were no statistical differences between primary and flap closure in regards to minor perineal complications or abdominal wall complications.

**Discussion:** Myocutaneous flap closure of pelvic defects following APR or PE for oncologic resection can be useful in decreasing the number of perineal complications, particularly major infectious complications, compared to primary closure. In spite of the increased muscular and fascial disruption posed by harvesting RAM flaps, there were no statistical differences in abdominal wall complications between the 2 groups. Large prospective studies with matched cohorts would be beneficial to further investigate these operations with high morbidity rates.

**Figure 1: Study Attrition Diagram**

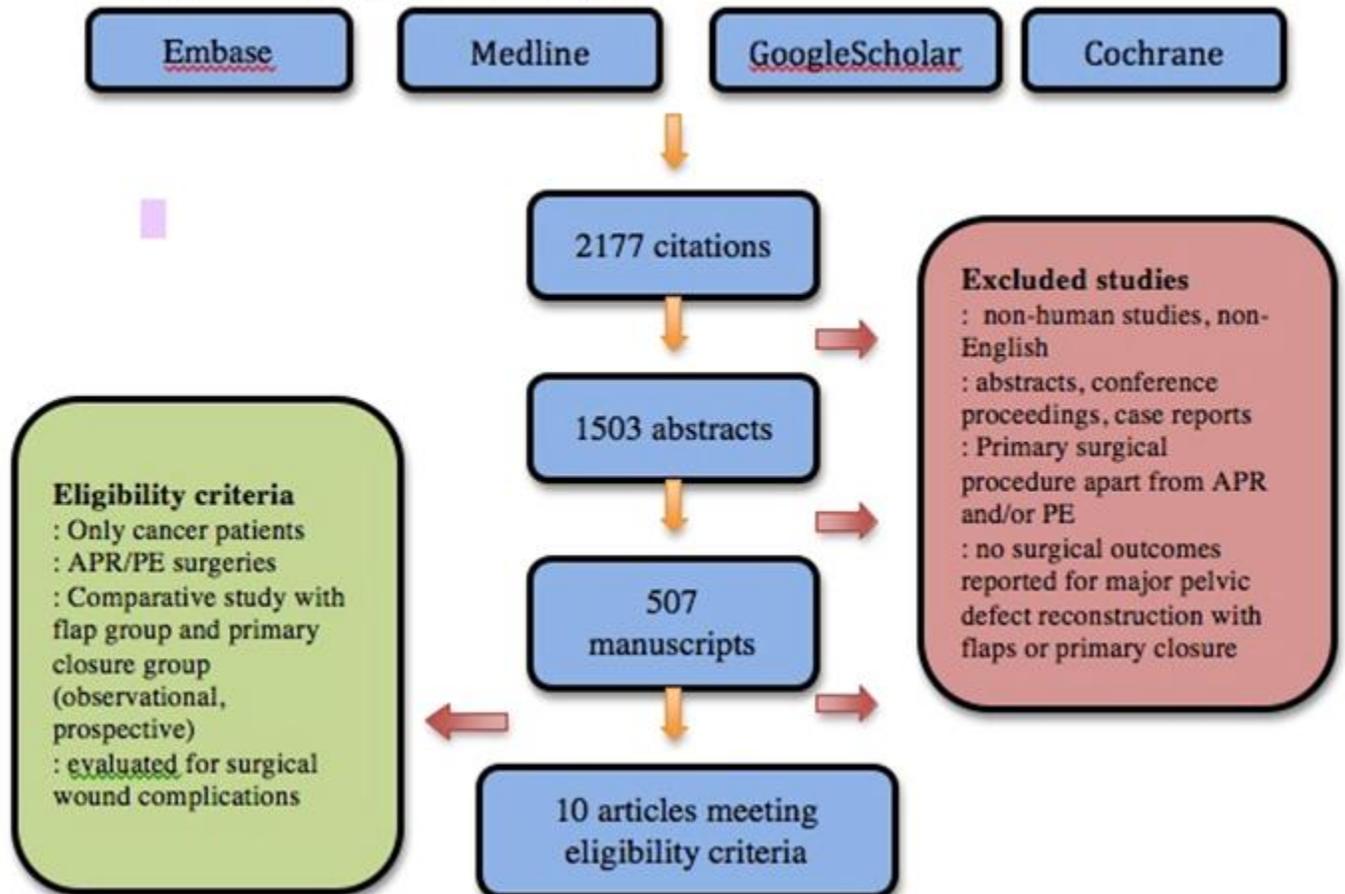
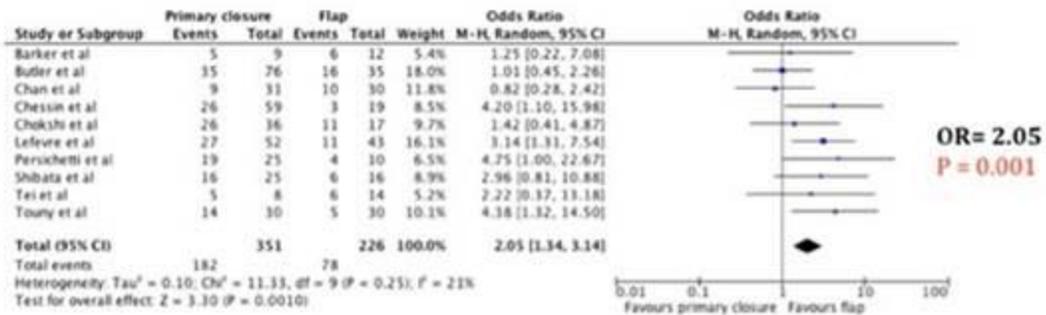


Figure 2 (A-D): Pooled odds ratio forest plot of surgical outcomes associated with flap versus primary closure.

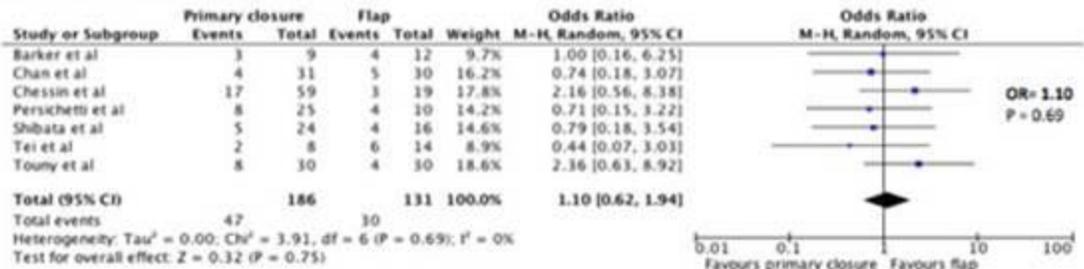
A) Total Perineal Complications



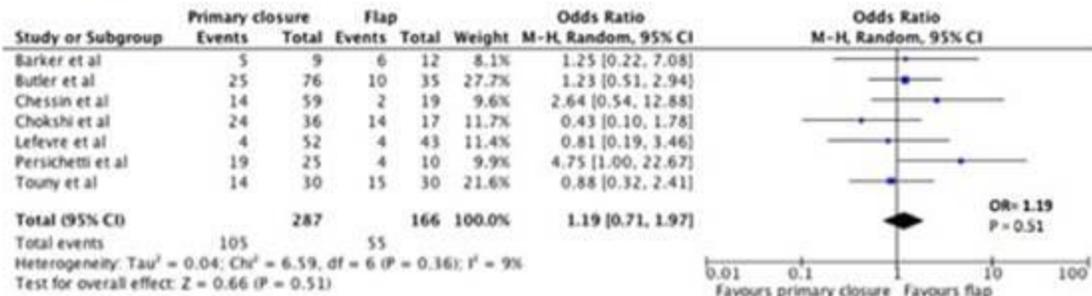
B) Major Perineal Complications



C) Minor Perineal Complications



D) Abdominal Wall Complications



**11:41 AM - 11:45 AM**

Strategies in Oncological Reconstruction: Modifications to the Keystone Perforator Flap Concept and Maintaining Vascular Integrity

Mayo Clinic , Rochester, MN, USA

Anita Tanniru Mohan, MRCS, MBBS, BSc; ARya Akhavan; Peter S. Wu, MD, MSc; Jorys Martinez-Jorge; Steven Moran; M. Saint-Cyr; Mayo Clinic

### **Background**

Perforator flaps can be useful for a spectrum of oncological reconstruction for cancer or sarcoma in the lower extremity. Microsurgical techniques and comprehensive understanding of location of perforators are important for successful design and execution these flaps as both pedicled and free flaps. However, keystone island perforator flaps, with a curvilinear design, have been well described in their role providing a reliable, safe flap harvest, minimized donor site morbidity, and obviating the need for microsurgical techniques. We present a comparative analysis of reconstructive our experience in using keystone flaps with other options of soft tissue cover in oncological reconstruction.

### **Methods**

A 5-year retrospective chart review was performed of soft tissue reconstruction following oncological resection in the limbs and trunk. Data was collected on patient demographics, tumor characteristic, surgical indication for reconstruction, defect and flap characteristics, type of soft tissue reconstruction, mobilization, length of stay and complications. A comparison of defect characteristics and flap designs, donor site morbidity and outcomes was performed. The aim was to compare the modified keystone island perforator flaps, to alternative soft tissue reconstructive options.

### **Results**

A total of 130 consecutive patients were included in the study. Over 85% of patients presented with a sarcoma and 61% involved the lower limb. 30 patients have undergone keystone perforator flap reconstruction. Average defect size in the lower limb was 285cm<sup>2</sup>. A summary of types and modifications to keystone flaps are included; both flap and defect sizes varied according to anatomical location. There were no flap or partial flap losses in the keystone group. Patients who underwent local perforator reconstruction, particular in the lower limb, were able to mobilize faster and had shorted hospital admission compared to muscle flap reconstructions.

### **Conclusions**

Keystone island perforator flaps have a role both a primary reconstructive option and in combination with other flaps in oncological reconstruction. With a better understanding of perforator anatomy and design of flaps along the longitudinal axis, with incorporation of dominant linking vessels can improve vascular reliability of these flaps. We have modified the design and harvest of these flaps to address large defects and gain greater freedom of movement.

The use of these flaps can provide a sound, reliable reconstruction, promoting faster operative time and recovery.

### **11:45 AM - 11:51 AM**

#### **Discussion**

### **11:51 AM - 11:55 AM**

Laparoscopic Assisted Extended Vertical Rectus Abdominus Myocutaneous Flap for Minimally Invasive Pelvic Reconstruction

The University of Texas MD Anderson Cancer Center, Houston, TX, USA

Alexander T. Nguyen, MD; Yi-Qian N. You, MD; George J. Chang, MD; The University of Texas MD Anderson Cancer Center

#### **INTRODUCTION:**

Immediate abdominal myocutaneous, specifically the Vertical Rectus Abdominus Myocutaneous (VRAM), flap reconstruction of extended abdominoperineal resection (APR) defects has been shown to be the primary choice to reduce wound complications compared to primary closure or other flap options. Complex pelvic resection for anorectal cancer (e.g. extended APR) may be approached minimally invasively, however normally precludes the use of the VRAM. We present the Laparoscopic Assisted Extended Vertical Rectus Abdominus Myocutaneous (LEVRAM) flap for minimally invasive pelvic reconstruction.

#### **METHODS:**

Seven consecutive patients undergoing minimally invasive robotic extended APR underwent immediate LEVRAM flaps for anal or rectal malignancies. Flap design and port placement were collaboratively reviewed intra-operatively. LEVRAM flaps were performed without additional port placement. Surgical outcomes were prospectively collected.

#### **RESULTS:**

All patients underwent successful minimally invasive surgery without conversion to an open procedure (APR + en bloc vaginectomy, n=3; extra-levator extended APR, n=4). All three female patients additionally required posterior vaginal wall reconstruction. Flap median characteristics include: 85 minute (range, 66-129 minutes) flap harvest, 4 cm (range, 3.5-5 cm) additional anterior rectus sheath fascial incision, and 333 cm<sup>2</sup> (range, 224-552 cm<sup>2</sup>) skin paddle. Median length of stay was 6 days (range, 5-7 days). Median follow up is 8 months (range, 1-20 months). No patients experienced partial or total flap loss. No donor site complications were encountered. One patient developed a superficial recipient site infection and dehiscence which was successfully treated with nonoperative local wound care.

#### **CONCLUSION(S):**

The Laparoscopic Assisted Extended Vertical Rectus Abdominus Myocutaneous (LEVRAM) flap provides the primary flap choice for optimal reconstruction of extended APR defects while still permitting the benefits of a minimally invasive approach. To our knowledge this is the first report of this technique.

### **11:55 AM - 11:59 AM**

Readmission following ventral hernia repair: a model derived from the ACS-NSQIP datasets  
University of Pennsylvania, Philadelphia, PA, USA

Jonas Nelson; John Fischer; Cyndi U. Chung, MS; Jason D. Wink; Ari Wes, BA; Joseph Serletti; Stephen Kovach, MD; University of Pennsylvania

Abstract

**Background:** Institutions are now incentivized to decrease rates of preventable readmissions. The purpose of this study was to examine readmissions following open ventral hernia repair (VHR), to ultimately create a model to preoperatively identify high risk patients.

**Study Design:** Utilizing the 2011 and 2012 ACS-NSQIP datasets, patients undergoing open VHR were identified by CPT codes. Patients who were readmitted in 2011 within 30 days of the procedure were compared to those who were not with regards to preoperative and operative characteristics. A bootstrap analysis was performed to identify internally validated risk factors to include in the final logistic regression, which was utilized to create a weighted model to predict the risk of readmission. This model was then validated on VHR patients in 2012.

**Results:** In 2011, 10,745 patients underwent VHR. Of these, 850 (7.9%) patients were readmitted within 30 days. The final bootstrap analysis demonstrated that active smoking, ASA $\geq$ 3, a history of bleeding disorder or anemia, long operative time, inpatient status, and concurrent panniculectomy were all independently associated with readmission following ventral hernia repair. Significant variables were assigned a weighted score, ranging from 1 to 3. Each patient was then placed into one of four cohorts according to their summed score. The model (Hernia Readmission Risk (HERR) Score) demonstrated that risk increased in a linear fashion, with the highest risk cohort having a 21% risk of 30 day readmission. The model was validated on the 2012 cohort, with confirmatory results.

**Conclusions:** Perioperative predictors of readmission following VHR include smoking, ASA score, operative magnitude, concurrent panniculectomy, and preoperative anemia and bleeding disorders. Early identification and intervention in high risk patients undergoing VHR may translate to decreased rates of readmission and cost savings for healthcare institutions.

### **11:59 AM - 12:03 PM**

Combined Targeted Biologic Therapy and Radical Resection for the Management of Recalcitrant Hidradenitis Suppurativa

Georgetown University Hospital, Washington, DC, USA

Michael V. DeFazio, MD; Kathryn S. King, BS; Kevin D. Han, MD; James Economides, MD;

Karen K. Evans, MD; Georgetown University Hospital

## **INTRODUCTION**

Recent trials demonstrating the safety and efficacy of biologic therapy in patients with moderate-to-severe hidradenitis suppurativa (HS) have paved the way for new multidisciplinary treatment strategies. We present our experience with targeted biologic therapy following radical resection for the management of recalcitrant HS.

## **METHODS**

A retrospective review was conducted for all patients treated for recalcitrant HS, using either surgical debridement alone, or in combination with targeted biologic therapy (anti-TNF agents), prior to definitive closure, between January 2010 and March 2014. For patients in the combined cohort, anti-TNF therapy was started 4 weeks after initial debridement. In both groups, the decision to close was guided by the presence of negative cultures, absence of clinical infection, and adequate response to local wound care. Demographic data, treatment regimen, wound response, and complication rates were documented for all cases. Statistical analysis was performed utilizing paired t-tests.

## **RESULTS**

Eighteen patients met study criteria. Of these, 11 (61%) underwent treatment with combined surgical debridement and biologic therapy, whereas debridement alone was performed in the remaining 7 patients (39%). The average number of debridements in the surgical and combined cohorts were 4.3 and 2.5, with a mean defect following final debridement of 18.5cm<sup>2</sup> and 22.3cm<sup>2</sup>, respectively ( $p>0.05$ ). All wounds were closed in a delayed primary fashion. Average interval between initial debridement and definitive closure in the surgical cohort was 42 days compared with 56 days in patients who underwent combined therapy ( $p>0.05$ ). Biologic agents included infliximab (n=8), ustekinumab (n=2), and belimumab (n=1). The average duration of biologic therapy was 13 months (r, 2-31 months). Of the 11 patients in the combined therapy cohort, 7 experienced complete remission of their disease following closure, without recurrence after an average of 11.9 months. The remaining 4 patients were noted to have partial recurrence after an average of 8 months (r, 2-14 months). Of the 7 patients treated with surgical excision alone, 1 patient experienced complete remission after 13 months. The remaining 6 patients were noted to have partial recurrence after a mean of 2 months (r, 0.75-10 months;  $p=0.03$ ). No adverse events were seen in patients who received biologic therapy.

## **CONCLUSION**

For the first time, we report outcomes following combined biologic and surgical therapy for the management of recalcitrant HS. Our results indicate a significantly greater remission rate and/or longer disease-free interval may be achieved through the use of this combined approach for patients with advanced disease.

**12:03 PM - 12:09 PM**

**Discussion**

**12:09 PM - 12:13 PM**

Salvage reconstruction of Pelvic and Perineal Resection Complications using Superior Gluteal Artery Perforator Flaps

The University of Texas MD Anderson Cancer Center, Houston, TX, USA

Alexander T. Nguyen, MD; Yi-Qian N. You, MD; George J. Chang, MD; John M. Skibber, MD; The University of Texas MD Anderson Cancer Center

**INTRODUCTION:**

Pelvic and perineal wound complications following complex pelvic resection for anorectal cancer (e.g. extended abdominoperineal resection) represent a significant source of morbidity for patients. In the setting of postoperative complications, the primary option for immediate reconstruction, the abdominal myocutaneous flap, is usually precluded. We present the use of superior gluteal artery perforator (SGAP) flaps for salvage reconstruction of wound complications following complex pelvic resections.

**METHODS:**

A series of consecutive patients who developed chronic pelvic and perineal wound complications after complex pelvic resection underwent delayed SGAP flap reconstruction. Appropriate debridement and meticulous flap design are described and essential to reconstructive success. Surgical outcomes were prospectively collected.

**RESULTS:**

Eighteen patients underwent successful SGAP flap reconstruction. Median age was 62 years old with a median BMI 30. Median wound duration was 1.7 months. All patients had anorectal cancer and received chemoradiotherapy. Reconstructive details include median: pelvic defect measured  $800\text{ cm}^3$  (range,  $192\text{-}6000\text{ cm}^3$ ), SGAP flap skin paddle measured  $406\text{ cm}^2$  (range,  $210\text{-}805\text{ cm}^2$ ), intrapelvic flap advancement and obliteration of 12 cm (range, 9-15 cm), of 3 perforators (range, 1-4), and operative time of 165 minutes (range, 85-219 minutes). Median follow up is 9 months (range, 1-16 months). Two patients required bilateral flaps due to insufficient adiposity. No patients experienced partial or total flap loss. No deep pelvic abscesses were encountered. One patient developed a superficial perineal recipient site dehiscence treated successfully with nonoperative local wound care. One patient required a celiotomy for small bowel obstruction.

**CONCLUSION(S):**

Superior gluteal artery perforator (SGAP) flaps are a reliable option for salvage reconstruction of wound complications following complex pelvic resections. We describe key technical considerations of flap design to maximize consistent, reproducible, and successful outcomes.

## **12:13 PM - 12:17 PM**

Versatility of the Pedicled ALT Flap in Functional Sensate Reconstructions

Clinics Hospital of the University of São Paulo, São Paulo, , Brazil

Guilherme Cardinali Barreiro, MD; Rachel Rossine Baptista; Kiril Endo Kasai; Daniel Marchi dos Anjos; Rolf Gemperli; Clinics Hospital Of the University of São Paulo

### **Introduction**

Pedicled ALT reaches defects ranging from the mid abdomen, thigh, inguinal area and perineum. (1) It can also be used with a reverse flow to cover the area around the knee and upper leg. The lateral femoral cutaneous nerve (LFCN) provides sensation. (2-3) It may carry multiple skin islands and the vastus lateralis muscle. We present 25 cases where a sensate pedicled ALT was used to cover defects beyond the borders of the thigh.

### **Method**

Forty flaps in twenty cadavers were dissected for pedicle measurements, arc of rotation and surgical planning. Sensation was guaranteed through dissection of the LFCN. From May 2010 to December 2012, twenty-five patients were reconstructed using the pedicled ALT flap. Age ranged from 28 to 60 years. Perforators were identified with a hand held Doppler. Vessels to the rectus femoris muscle were ligated for elongation of the main pedicle.(4) For the inguinal and perineal defects a tunnel was made under the proximal part of the sartorius and the rectus femoris muscles. The flap rotated in a subcutaneous tunnel for the lateral defects. For the reverse type superdraining was performed.

### **Results**

Seventeen fasciocutaneous and eight myocutaneous flaps were harvested, 91% had the inclusion of the LFCN. The donor area was grafted in 8 patients and no complications were observed. The reverse flow flap needed superdraining to the safena magna. All flaps healed completely. Sensation similar to the contralateral thigh was achieved in the two-point discrimination test. Six functional vaginas, femoral vessels and exposed bone or prostheses were successfully reconstructed. Five minor dehiscences were treated conservatively. Discharge was after an average of 10 days. Mean follow up was 6 months.

### **Conclusion**

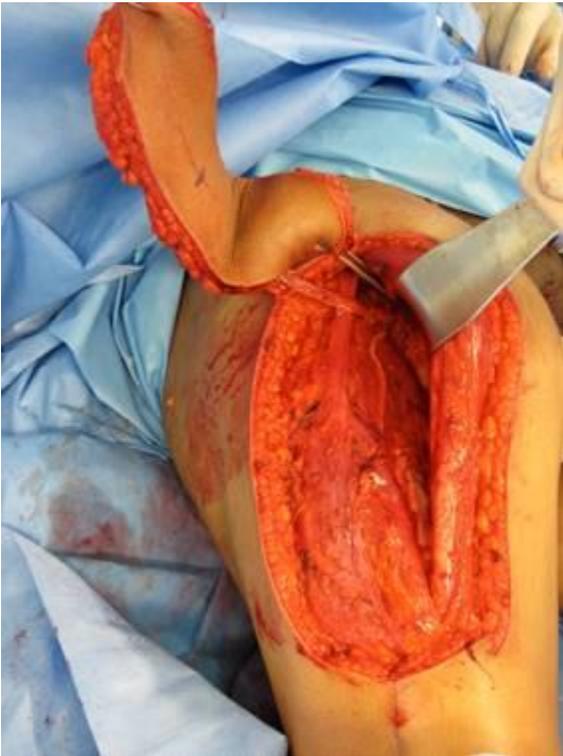
Functional sensate reconstruction around the thigh, inguinal area, lower abdomen, perineum and upper leg can be achieved through the inclusion of the lateral femoral cutaneous nerve in the pedicled ALT flap. Superdraining of the reverse flow flap is suggested to relieve congestion.

### **References**

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2. P. C. Neligan, D. A. Lannon, *Clin Plast Surg* **37**, 677 (Oct, 2010).
3. A. I. Gravvanis *et al.*, *Microsurgery* **26**, 432 (2006).
4. J. Ver Halen, P. Yu, *Plast Reconstr Surg* **125**, 130e (Mar, 2010).

**Figures:**



**Figure 1:** Pedicled sensate cutaneous ALT for perineal reconstruction.



**Figure 2:** Immediate post op with a functional vagina.

**12:17 PM - 12:21 PM**

Optimizing Successful Outcomes in Complex Spine Reconstruction Using Local Muscle Flaps

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Leslie Erin Cohen, MD; Natalia Fullerton, MD; Andrew L. Weinstein, MD; Lily R. Mundy, BS;

Jill J. Ketner, PA; Jason A. Spector, MD, FACS; Roger Hartl, MD; New York Presbyterian

Hospital, Weill Cornell Medical College

Post-operative wound complications in patients undergoing spinal surgery can have devastating effects including hardware exposure, meningitis, and result in unplanned re-operation. The literature shows that wound complication rates in this population approach as high as 50% in “high-risk” patients (prior spinal surgery, existing spinal wound infection, prior cerebral spinal fluid (CSF) leak, or history of radiation). In light of reports that muscle flap coverage may improve these complication rates in high-risk patients, we aimed to investigate if prophylactically closing spinal wounds with muscle flaps improves outcomes.

A retrospective review was performed of all patients who underwent spinal wound closure via paraspinous muscle flaps, with or without trapezius or latissimus muscle advancement flaps by a single plastic surgeon from 2006 to 2014. Data regarding pre-surgical diagnosis, indication for plastic surgery involvement, and incidence of post-operative wound complications, including infection, dehiscence, or seroma formation was recorded. In addition, a history of prior radiation therapy, diabetes, spinal surgery, steroid use, paralysis, body mass index, preoperative albumin level, hemoglobin level, level of closure, type of muscle reconstruction and reoperation rates were noted.

96 cases were included with follow up ranging from 2-60 months. Indications for surgery included tumor resection, spinal fusion, laminectomy, osteomyelitis and traumatic fracture. Eighty-three cases were classified as “high-risk” for wound complications, including those having prior spinal surgery (80), existing spinal wound infection (35), CSF leak (18), and prior radiation (16). The remaining thirteen cases were classified as “low-risk”. Of the 96 closures, there were 11 wound complications (9 patients), 5 of whom had infections pre-operatively, with only a 2.2% re-operation rate for these complications. Wound complications was significantly lower in the low-risk versus the high-risk group (0% vs. 13%  $p=0.001$ ). Variables that were significant predictors of wound complications were a history of radiation ( $p= 0.00034$ ) and surgery at the level of the thoracic spine ( $p= 0.024$ ).

In this study there is a low rate of post-operative wound complications after closure of spinal wounds with local muscle flaps in both high and low risk patients. These data support safe and routine use of muscle flap closures on patients undergoing spinal surgery in order to prevent postoperative wound complications, increase hardware salvage rates and lower re-operation rates.

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**Discussion**